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Trends in Cropland Acreage and Fertilizer Use in Kentucky since 1980

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UNIVERSITY OF KENTUCKY
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Lexington, Kentucky 40546

COOPERATIVE EXTENSION SERVICE
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Agronomy notes

TRENDS IN CROPLAND ACREAGE AND FERTILIZER USE IN KENTUCKY SINCE 1980

K.L. Wells

Cropland acreage and patterns of fertilizer use varied considerably during the period 1980-1991. Variation in cropland acreage is largely related to commodity prices, available markets, land ownership patterns, and government programs. Patterns of fertilizer use are affected by cropland acreage, the nature of the fertilizer supply industry in Kentucky, weather, and improved efficiency in use of time and labor by farmers. The situation in the early 1990's is different than it was in 1980, and the following discussion highlights changes that have taken place. Fertilizer use data are those reported by the University of Kentucky's Division of Regulatory Services in the Kentucky Agricultural Statistics annual reports.

Changes in Cropland Acreage

For the purpose of this report, cropland is defined as the sum of acres planted to corn, soybeans, wheat, tobacco, and grain sorghum plus acres of all hay. Even though locally important, acreages of horticultural crops are not included for two reasons: *(1)* there are no reliable acreage reports, and *(2)* the total acreage for the state would be small. The cropland acreage discussed here also does not include pastureland, which is estimated to be somewhere between 5 and 8 million acres.

There are just over 25 million acres of land surface in Kentucky of which 11.4 million acres are considered usable for cropland and an additional 3.5 million acres which should be kept in permanent pasture. The proportion of this 11.4 million acres actually used for cropland varies, due largely to the factors mentioned above. It has varied from 48% in 1980 to a high of 53% in 1981 and 1982, and a low of 45% in 1987. Corn, wheat, soybeans, tobacco, and grain sorghum represented 35% of the cropland base in 1980 and 31% in 1990. They dropped to around 25% in 1987 and 1988, due largely to a reduced soybean acreage. These acreages are shown in Table 1 for the years 1980 to 1991. The most notable changes during this period were sizeable reductions in soybean acreage and a sizeable increase in hay production. On a percentage basis, for example, alfalfa acreage increased by 75% between 1980 and 1991.

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Shift In Fertilizer Tonnage

While fertilizer tonnage largely reflects changes in cropland acreage, there has been a noticeable drop in fertilizer usage due to other factors. It is possible that this reflects increased soil fertility levels. Based on soil samples tested in UK's Soil Testing Lab, there was a major increase in percentage of samples testing high or very high in P and K from 1975 to 1985 for all major agronomic crops in Kentucky. Total annual tonnage dropped from over 1 million tons in the first half of the 1980's to under 0.9 million tons during the last half of the 1980's and early 1990's. In terms of average fertilizer use per cropland acre, it has dropped from around 380 pounds to around 300 pounds during the past few years. Figure 1 shows changes in the cropland acreage and fertilizer use for the period of 1981-1991.

Shifts In Sources Of Fertilizer N

During this period, there has also been a shift in sources of fertilizer nitrogen (N) used in Kentucky. As shown in Figure 2, urea has become the largest single source of fertilizer N, reflecting a drop in the use of ammonium nitrate and mixed fertilizers. The proportions of N from anhydrous ammonia and N-solutions has remained fairly constant, while the proportion of N from diammonium phosphate (DAP) has slowly increased.

Seasonal Use Of Fertilizer

Most of the fertilizer is used during the period March-June. During the period 1982-91, nearly 70% of the annual tonnage was used during these 4 months. About 20% is used during the fall season, July-December, with the remaining 10% during January-February. The variation which occurs in these percentages is largely due to effects of weather patterns.

Type Of Fertilizer Used

In 1980, about half the fertilizer used in Kentucky was mixtures and about half was materials. As shown in Figure 3, there was a slow change toward the use of more materials from 1980 to 1989, and a very rapid shift after 1989. This shift possibly is as much a reflection of increased custom blending as a dramatic shift to greater use of materials, since fertilizer components used in preparing custom blends are often reported as materials rather than mixtures.

Form Of Fertilizer Used

Solid fertilizers are by far the most commonly used form of fertilizer in Kentucky. As shown in Figure 4, they make up about 86% of the total fertilizer tonnage used. This has not changed during the timespan of this discussion (1980-91), and in fact, has changed very little since 1970. The shift towards greater use of bulk dry fertilizers as compared to bags continued during the 1980's, bagged use dropping from 35% of dry fertilizer in 1980 to 20% in 1991.

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Table 1.

Kentucky, Acres Planted and Fertilizer Used[1/]

Crop	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Corn	1,650,000	1,680,000	1,680,000	1,230,000	1,650,000	1,740,000	1,730,000	1,300,000	1,300,000	1,330,000	1,350,000	1,400,000
Wheat	450,000	810,000	810,000	740,000	670,000	430,000	440,000	500,000	550,000	630,000	700,000	640,000
Tobacco, Burley	185,000	218,000	220,000	186,000	210,000	170,000	140,000	140,000	150,000	172,000	185,000	213,000
Tobacco, Dark	15,900	16,600	19,100	17,300	17,500	16,300	13,300	8,300	8,000	10,200	9,150	10,200
Soybeans	1,650,000	1,750,000	1,700,000	1,450,000	1,520,000	1,260,000	1,200,000	990,000	980,000	1,200,000	1,250,000	1,150,000
Sorghum	NR	NR	48,000	48,000	130,000	150,000	60,000	30,000	15,000	13,000	35,000	32,000
Alfalfa Hay	200,000	200,000	204,000	225,000	230,000	250,000	255,000	269,000	320,000	370,000	320,000	350,000
Other Hay	1,360,000	1,360,000	1,380,000	1,300,000	1,450,000	1,600,000	1,540,000	1,900,000	1,950,000	1,850,000	1,880,000	1,950,000
Total Crops	5,510,900	6,034,600	6,061,100	5,196,300	5,877,500	5,616,300	5,378,300	5,128,300	5,273,000	5,575,200	5,729,150	5,745,200
Tons Fert.[1/]	1,037,300	1,149,314	1,112,054	915,131	1,008,288	907,219	884,538	841,925	837,889	824,872	871,295	864,664
lbs Fert./Acre	376	381	367	352	343	323	329	328	318	296	304	301

1/Data from Kentucky Agricultural Statistics, annual reports.

2/Calendar year basis.

Figure 1.

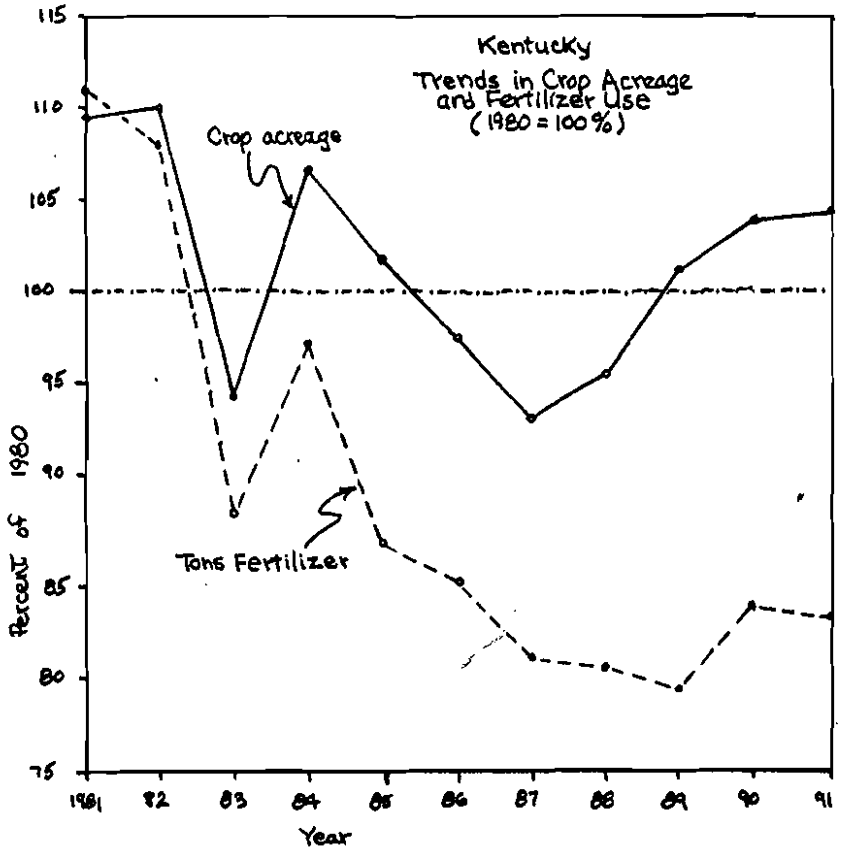
Kentucky
Trends in Crop Acreage and Fertilizer Use
(1980 = 100%)
Crop acreage
Tons Fertilizer
Percent of 1980
115
110
105
100
95
90
85
80
75
1981
82
83
84
85
86
87
88
89
90
91
Year

Figure 2.

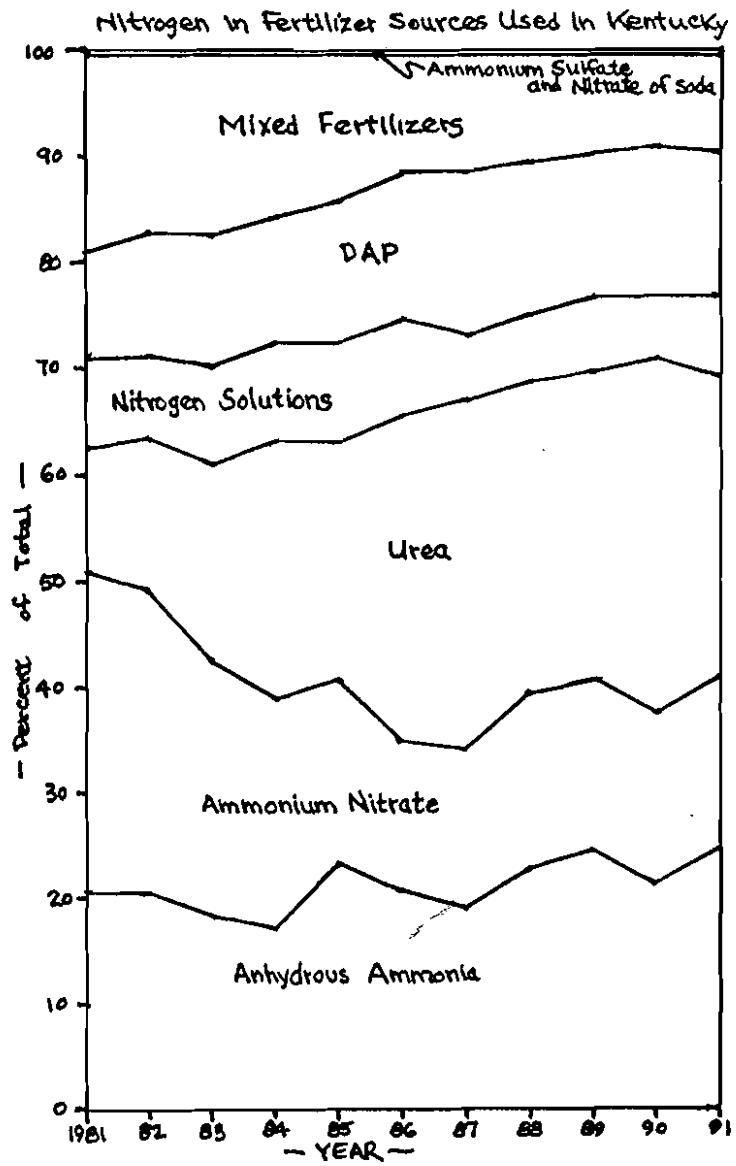
Nitrogen in Fertilizer Sources Used in Kentucky
Ammonium Sulfate and Nitrate of Soda
Mixed Fertilizers
DAP
Nitrogen Solutions
Urea
Ammonium Nitrate
Anhydrous Ammonia
Percent of Total
100
90
80
70
60
50
40
30
20
10
0
1981
82
83
84
85
86
87
88
89
90
91
YEAR

Figure 3.

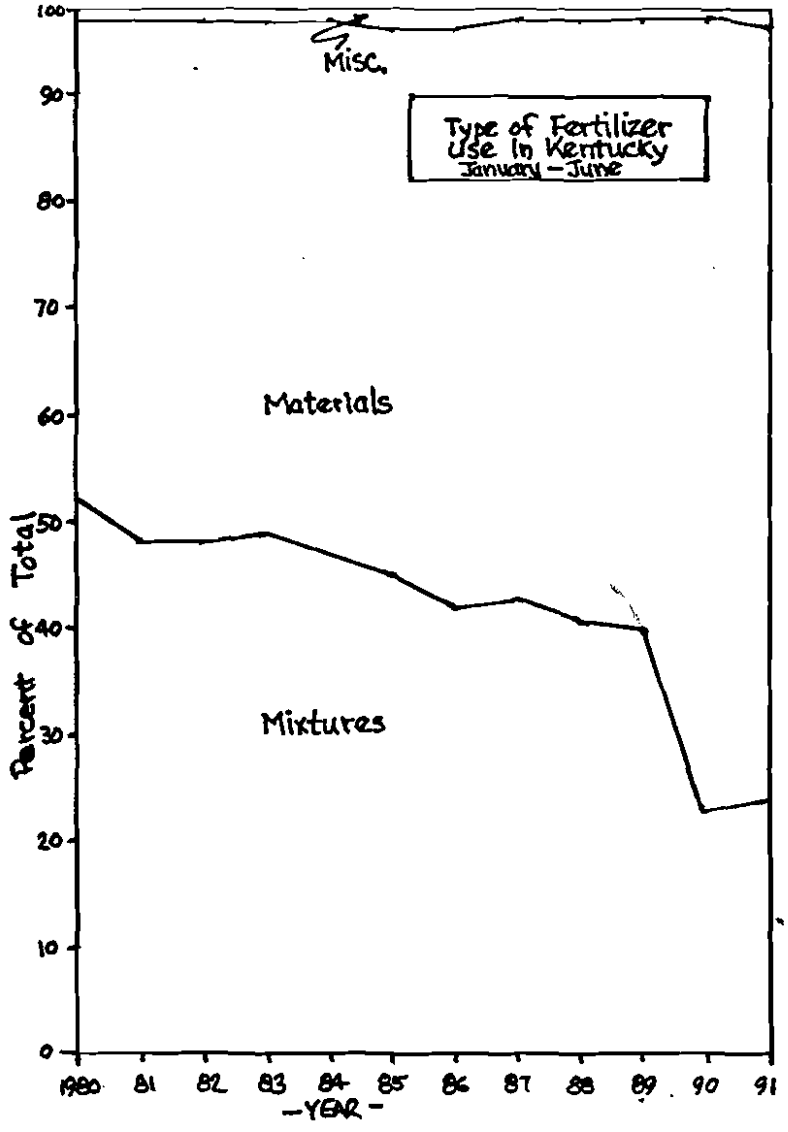

Figure 4.